

HONEY RUN BRIDGE

(Carr Hill Bridge)

National Covered Bridges Recording Project

Spanning Butte Creek, bypassed section of Honey Run Road

(originally Carr Hill Road)

Paradise vicinity

Butte County

California

HAER CA-312

CA-312

PHOTOGRAPHS

PAPER COPIES OF COLOR TRANSPARENCIES

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD

National Park Service

U.S. Department of the Interior

1849 C Street NW

Washington, DC 20240-0001

HISTORIC AMERICAN ENGINEERING RECORD

HONEY RUN¹ BRIDGE **(Carr Hill Bridge)** **HAER No. CA-312**

Location: Bypassed section of Honey Run Road (originally Carr Hill Road), spanning Butte Creek in Butte Creek Canyon, Paradise vicinity, Butte County, California
UTM: 10.611088E.4398498N, Hamlin Canyon, CA Quad.

Structural Type: Wood/iron covered bridge, modified Pratt truss

Date of Construction: Probably 1886

Designer/Builder: American Bridge Company

Present Owner: Butte County, California

Caretaker: Honey Run Covered Bridge Association

Present Use: Pedestrian bridge; Historical attraction

Significance: The Honey Run Bridge is the best preserved of four surviving examples of Pratt-type wood covered bridges in the United States. The Pratt truss was patented by Thomas and Caleb Pratt in 1844 and featured wood compression members and iron tension members. The design, favored for its strength and adaptability, became the standard American truss for moderate spans on both railroads and highways by 1870 and remained so well into the twentieth century.

Historian: Researched and written by Lola Bennett, September 2002.

Project Information: The National Covered Bridges Recording Project is part of the Historic American Engineering Record (HAER), a long-range program to document historically significant engineering and industrial works in the United States. HAER is administered by the Historic American Buildings Survey/Historic American Engineering Record, a division of the National Park Service, U.S. Department of the Interior. The Federal Highway Administration funded the project.

¹ The name Honey Run is said to derive from the honeybees that nested in the buttes surrounding the bridge.

Description

The Honey Run Bridge is a three-span timber covered bridge on 36" iron clad column piers and mortared fieldstone abutments. The total length of the bridge is 241 feet. The northern span is a kingpost truss, 30 feet long and 7'-6" high; the center span is a Pratt truss, 128 feet long and 23 feet high; the southern span is a Pratt truss, 80 feet long and 15'-6" high. The trusses are spaced 18' apart. The timber deck has a width of 17'-6" between wood plank side railings.

The northern span is framed as a kingpost truss. The sloped compression members are 10x10" timbers, joined at center span. The lower chords are a pair of 7/8" square bars that pass through the lower ends of the sloped compression members. The sloped members and the bottom chord are connected at midspan by a pair of kingrods, vertical 7/8" square bars with threaded ends, which pass through a metal plate below the transverse floor beam and another plate above the upper compression members, where they are fixed with nuts. Outriggers have been incorporated with the transverse floor beam to provide lateral stability and a supplemental timber bent has been added to increase the load-bearing capacity of the span.

The center span is framed as a six-panel modified Pratt through truss, featuring horizontal upper and lower chords connected by vertical wood compression members, diagonal iron tension members, and sloped wood endposts. The upper chords are 12x14" timber beams and the lower chords are paired 5/8x2 1/2" metal eyebars. The chords are connected by 7x8" vertical timber posts and paired rods or rectangular bars. The rods and bars are crossed in the two center panels and angle up towards the ends in the end panels. The trusses are cross-braced overhead with timbers and rods at each panel point. There are metal rod sway braces between the trusses at the plane of the lower chord in each of the six panels. The floor system is supported by 12x18" transverse floor beams suspended below the lower chord at each panel point. The five 12x18" timber transverse floor beams have heavy steel channel type beams bracketed to the sides (apparently a modern addition). There are ten lines of longitudinal stringers on top of the transverse floor beams. The transverse floor beams extend to the outside of the trusses and support the framework (nailers) for the wall covering. The deck consists of 4x12x18" timbers laid transversely on the stringers, and 3x12" running boards laid longitudinally on top of the deck.

The southern span is framed as a five-panel modified Pratt through truss.² The upper chord is a 10x12" timber member and the lower chord is paired 1/2x2" or 5/8x2" metal eyebars. The chords are connected by 6x8" vertical timber posts and paired 3/4" diameter rods or 9/16x1 1/2" bars. The rods and bars are crossed in the center panel and angle up towards the ends in the end panels. The truss is braced overhead with timbers and rods at each panel point. There are metal sway braces between the trusses in each panel both overhead and under the deck. The panels of each

² This span was rebuilt with new timber following a truck accident in 1965; some of the iron was reused and some of the iron was new.

truss are connected at both the top and bottom chord with a 2" diameter steel pin through the fabricated metal assembly that holds the ends of the timber members and eyebars, or rods, in place. There is a floor beam suspended below the lower chord at each pin. The pin passes through the lower lateral bracing (3/4" diameter rods with looped ends), the eyes of the lower chord, the diagonal rods, and looped rods suspending the transverse floor beams. The looped rods pass alongside the floor beam and through a metal plate below each beam, where they are secured with nuts.

The roof system is composed of 2x4" rafters that frame from the top nailers on the outside of the trusses. The rafters are spaced 24" apart and support 2x4" wood purlins to which corrugated metal roofing is fastened. There are 1x6" wood collar ties between the rafters. The height of the gable roof over each span corresponds to the height of each truss, giving the center span a noticeably higher roofline than the end spans. A sprinkler system has been installed along the roof the full length of the bridge.

The timbers of the two original spans (northerly and center) are covered with sheet metal on the top and both sides, evidence that the bridge was originally uncovered. The exterior of the bridge is presently covered the full height of the trusses with vertical board siding fastened to 4x4" framing generally supported on the ends of the transverse floor beams which extend beyond the outer face of the trusses. The entire housing, including the roof, appears to be a self-supporting structure, with the lower nailers resting on the transverse floor beams and piers. This was presumably done to transfer the dead load of the walls and roof to a direct loading position on the truss. The center span has two 12x36" windows on each side (one in each of the two center panels). The portals are straight with squared openings with chamfered corners. A relatively new sign over the north portal reads "Honey Run Covered Bridge 1894." Iron gates have been installed at both portals to secure the bridge at night.

The abutments are mutated fieldstone and the column piers are riveted iron tubes filled with concrete. The lower chords of the center span rest on bolster beams over the piers. The floor stringers of the end spans rest on large bedding timbers on top of the abutment facewalls.

California Covered Bridges

Within a year of the discovery of gold at Sutter's Mill at Coloma in 1848, the population of California tripled³, and there was an urgent demand for roads and bridges, a demand initially met by the establishment of privately financed ferries, turnpikes and toll bridges. Aside from "two

³ According to Philip Varney's Ghost Towns of Northern California, "In 1848, only 400 people immigrated to California. During the following year, with word of [James] Marshall's discovery trumpeted around the world, an astounding 90,000 people descended upon the area. ...Between 1848 and 1860, California's population exploded from 14,000 to 300,000." [p.10]

minor structures,” there were no bridges in California prior to 1850,⁴ when John T. Little of Castine, Maine, built the first covered bridge west of the Mississippi River, a 550-foot span across South Fork at Salmon Falls. His crews later erected at least two more wood covered toll bridges. The editor of the Sacramento Transcript praised Little’s efforts, stating, “When the rivers are high, communication can be kept open by means of these bridges with some of the richest dry diggings in the country, which otherwise would be inaccessible.”⁵

By the mid 1850s there were at least one hundred toll bridges in the gold mining region of California.⁶ The majority of these were timber truss bridges and, presumably, many of them were covered.⁷ Over time, however, the covered bridges were replaced with new structures, or lost to floods, fires, vandalism, neglect or decay. By 1938 there were still thirty covered bridges in California;⁸ today only twelve remain.⁹

Site History

Following the discovery of “the single biggest piece of gold ever found in North America,”¹⁰ a fifty-four pound gold nugget, in Dogtown (later Magalia) in 1859,¹¹ people flocked to Butte County. This necessitated the construction of a network of roads and bridges. One of the most needed routes was from Butte Creek Canyon to Paradise Ridge. According to the Butte County Board of Supervisors minutes of 1883, the board responded to a petition from the citizens of Magalia and Paradise and ordered that the road be laid out and built. Money was raised by subscription, and in the fall of 1884 the contract was awarded to A.H. Chapman. “Thirty men were immediately given work, and the grading and filling and blasting continued during the winter when weather permitted.”¹² In May of 1885, a committee visited the scene of the work and “found a very good mountain road, not being too steep, and found it was being constructed with great care, so as to prevent washouts and landslides.”¹³ During the trip, the committee also chose the site for a bridge across Butte Creek, near the intersection of Centerville Road.

⁴ F.W. Panhorst, “A Century of Bridge Progress,” California Highway and Public Works Magazine, Centennial Edition, vol. 29, no. 9 and 10, September 9, 1950, p.114. Panhorst’s statement is apparently based on descriptions of travelers to California prior to 1850.

⁵ Century of Bridge Progress, p.17.

⁶ Century of Bridge Progress, p.22.

⁷ Stephen Mikesell, Historic Highway Bridges of California (Sacramento: California Department of Transportation, 1990), p.3.

⁸ S. Griswold Morley, The Covered Bridges of California (Berkeley: University of California Press, 1938), p.1.

⁹ Three of the twelve have been built since 1963.

¹⁰ Joseph F. McGie, History of Butte County, 1840-1919, p.59.

¹¹ According to George Mansfield’s History of Butte County [p.74], “The nugget, known as the ‘Dogtown Nugget,’ was taken to San Francisco and melted into a bar which weighed forty-nine and a half pounds and netted \$10,690.”

¹² John S. Waterland, “Behind the Building of Honey Run Road,” Chico Enterprise-Record, January 3, 1988, p.68.

¹³ “Behind the Building of Honey Run Road,” p.68.

Bridge Construction

In September 1886 the Butte County Board of Supervisors ordered the County Clerk to publish a notice to contractors for plans and proposals for a wood bridge across Butte Creek at the Carr Hill Road crossing. In this notice, the supervisors listed the following specifications:

The bridge in the center to be at least 7 feet above high water mark; center piers to be two iron cylinders, about 5 and 9 feet in height respectively, filled with concrete, resting on the large rocks that project in the stream; the western shore pier also to be an iron cylinder filled with concrete. There is to be a clear span over the main channel not less than 125 feet in length; a rock wall or abutment to be built at each end about 5 feet high, rock to be laid in cement mortar. Total length of bridge needed, 240 feet, width 16 feet. To be constructed in a substantial manner, and all square timbers to be of No. 1 spruce. The Board prefers the Howe Truss pattern for the longest span, and strain beam for short spans, but bidders may make their bids in whatever kind of truss they prefer.¹⁴

Three proposals were received and the contract was awarded to the American Bridge and Building Company for \$4295. George Miller was appointed superintendent of construction. The bridge was described in the newspaper as follows:

On Wednesday a contract was let by the Board for the building of a Pratt truss iron combination bridge at the Butte Creek crossing of the Carr Hill road. The price to be paid is \$4,295. The bridge is to be 240 feet in length, and 18 feet in width, the piers are to be iron cylinders 44 inches in diameter filled with concrete, the spans are 126 feet, 80 feet and 39 feet. The bridge is to be a strong and durable structure of the best class of bridge architecture.

A contract was also let for the building of the same style and general plan of bridge at Rock Creek on the Chico and Shasta road for \$2,050. Both bridges are to be built by the American Bridge Company of San Francisco, and are to be ready for travel by December 1st.¹⁵

On January 3, 1887 Miller reported that the Butte Creek Bridge had been completed in accordance with the contract and it was accepted by the Board.

According to contemporary sources, in 1894 a flood washed the Carr Hill Bridge downstream, and no immediate plans were made to rebuild it. Subsequently, three children drowned while trying to ford the river on their way to school, and there was enough public outrage that a new

¹⁴ "Notice to Contractors," Chico Enterprise, April 1886.

¹⁵ "Bridge Building in Chico," Chico Enterprise, October 8, 1886.

bridge was constructed in 1896. No documentary evidence has been found, however, to confirm the latter construction date.¹⁶ According to newspaper accounts, the story of the three children drowning is true,¹⁷ but the location where they drowned is described as a quarter mile from their house that was “four miles from town [Chico],” and Chico is eight miles from the bridge. In addition, the 1901 Butte County Board of Supervisors Minutes state that, at that date, the Carr Hill bridge was in a state of disrepair, suggesting that more than five years had elapsed since its construction. Together with the close correlation of the 1886 specifications to the present bridge, this information strongly suggests that the present bridge is the 1886 structure.

Physical and documentary evidence indicates that the bridge was not covered at the time of its construction. The timber trusses of the center and westerly span are covered with metal sheathing, which would have been unnecessary if the bridge had been weatherboarded and roofed. In 1901, George Miller sent a letter to the Board of Supervisors stating:

The flooring and timbers were very badly decayed and it was necessary to replace the whole floor system with new materials which in my judgment makes the bridge as good as the original. I would also recommend that the bridge be housed-in, the cost which would be about \$560.00.¹⁸

No written records have been found to document when the bridge was covered, but presumably it was done soon after Miller’s recommendation.

Bridge Design

Historian Carl Condit has called Thomas Pratt (1812-1875) “the most thoroughly educated American bridge builder at the beginning of the railroad age.”¹⁹ Born in 1812 to Boston architect Caleb Pratt, Thomas Pratt was educated in building construction as a young man. He studied architecture at Rensselaer Polytechnic Institute, and subsequently went on to work for the Army Corps of Engineers. In 1833 he began his career designing bridges for railroads and was employed as a structural engineer by a number of railroad companies.

¹⁶ The National Register Nomination for Honey Run Bridge cites original 1894 plans for the bridge in the Butte County Public Works Department. These have not been found. “As-Built” plans generated from a 1947 study completed by the Donald R. Warren Company are available in the Butte County Public Works Office. Lois McDonald’s article “The Roads and Bridges of Butte Creek Canyon,” discovered after the author’s research was completed, states: “I have read that this bridge was washed out by high water in early 1894 and 1895, but though careful review of newspapers for 1894 and early 1895 found reports of high water and threat to several bridges, no word that the Butte Creek Bridge at Carr Hill Road was in danger.”

¹⁷ “Three Children Drown,” *Chico Enterprise*, April 19, 1895.

¹⁸ The letter, quoted in a Butte County Historical Society bulletin, has not been located, but Miller’s recommendation to house the bridge was also reported in, “Report on Bridge Work,” *Chico Enterprise*, July 5, 1901.

¹⁹ Carl W. Condit, *American Building Art, the Nineteenth Century* (New York: 1960), p.109.

In 1844, Thomas and Caleb Pratt received a patent for a truss featuring vertical wood compression members and diagonal iron tension members, a design that was “superior to Howe’s mainly in the more functional distribution of tensile and compressive stresses in the various members.”²⁰ Developed at a time when railroads were placing new demands on bridges and the structural action of trusses was just beginning to be understood, the Pratt truss (together with the Howe and Whipple trusses) heralded the transformation from empirical to scientific bridge design. While the type was not immediately popular for wood spans, it became so after the Civil War, when, along with other truss types, it was built with wood and iron or all iron members.²¹ The Pratt truss was favored for its straightforward design, strength and adaptability, and by 1870, in an all-steel version, it had become the standard American truss for moderate spans on both railroads and highways, and remained so well into the twentieth century. As noted by J.A.L. Waddell in 1916: “The Pratt truss...is the type most commonly used in America for spans under two hundred and fifty (250) feet in length. Its advantages are simplicity, economy of metal, and suitability for connecting to the floor and lateral systems.”²²

Subsequent History of the Bridge

On April 12, 1965, a truck crashed into one corner of the bridge, collapsing the eastern span. Due to the collapse, and partly due to the very limited load capacity of 3 tons per vehicle, as well as the age and maintenance of the bridge, the Butte County Department of Public Works initiated plans for a new two-lane highway bridge for an adjacent site just upstream of the covered bridge. Construction of a new four-span composite steel girder bridge was approved by the State Reclamation Board, provided “that the County of Butte will properly maintain the existing bridge to insure its stability.” While the new bridge was under construction in 1965-66, public support was growing in favor of restoring and preserving the covered bridge. A thousand people signed petitions, the Honey Run Covered Bridge Association was formed, and funds were donated for reconstruction. These efforts “were helped significantly with the donation of \$10,000 by the Larwin Corporation (Developer of Paradise Pines).”²³ The bridge was rehabilitated and opened to pedestrian-only loading in 1972.

²⁰ American Building Art, p.111.

²¹ This is one of only a few surviving examples of the revised combination wood and iron Pratt truss. According to covered bridge historian Joseph Conwill, little is known about the history of this type, but it may have been “a back-formation from all-iron trusses.” Wood covered bridges of this type include Honey Run, Felton, Trinity Ranch, Cartersville, Springwood and Eagle Rock.

²² J.A.L. Waddell, Bridge Engineering, vol. I (New York, 1916), p.468.

²³ Donald C. Becker, “Honey Run Covered Bridge,” undated, typed manuscript in the files of the Butte County Department of Public Works, Oroville, California.

Chronology

1859—Gold found near Paradise, California.

1883—Carr Hill Road (now Honey Run Road) laid out.

1886—Bridge constructed by American Bridge & Building Company of San Francisco.

1894—Bridge reportedly washed out in a flood and subsequently rebuilt in 1896.

1901—George Miller repairs, and recommends covering, the bridge.

1951—Skyway replaces Carr Hill Road as the primary route between Chico and Paradise.

1965—Honey Run Bridge's eastern span destroyed by truck accident and bridge closed to traffic.

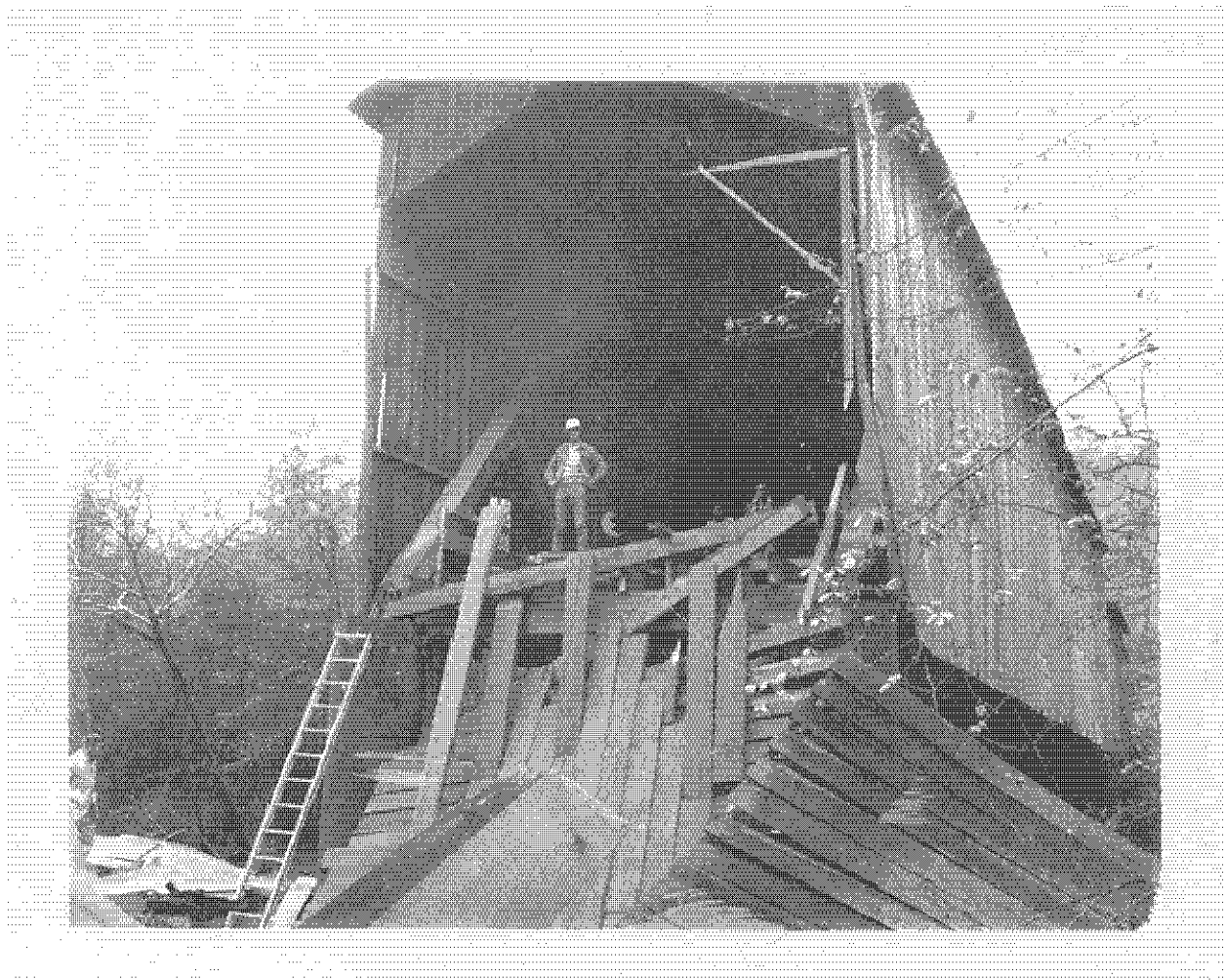
1966—Bridge bypassed with concrete and steel bridge.

1972—Bridge reconstruction completed.

1985—Siding replaced.

Appendix A – Historic Photographs

April 12, 1965. Photograph courtesy of Raymond Cooper.



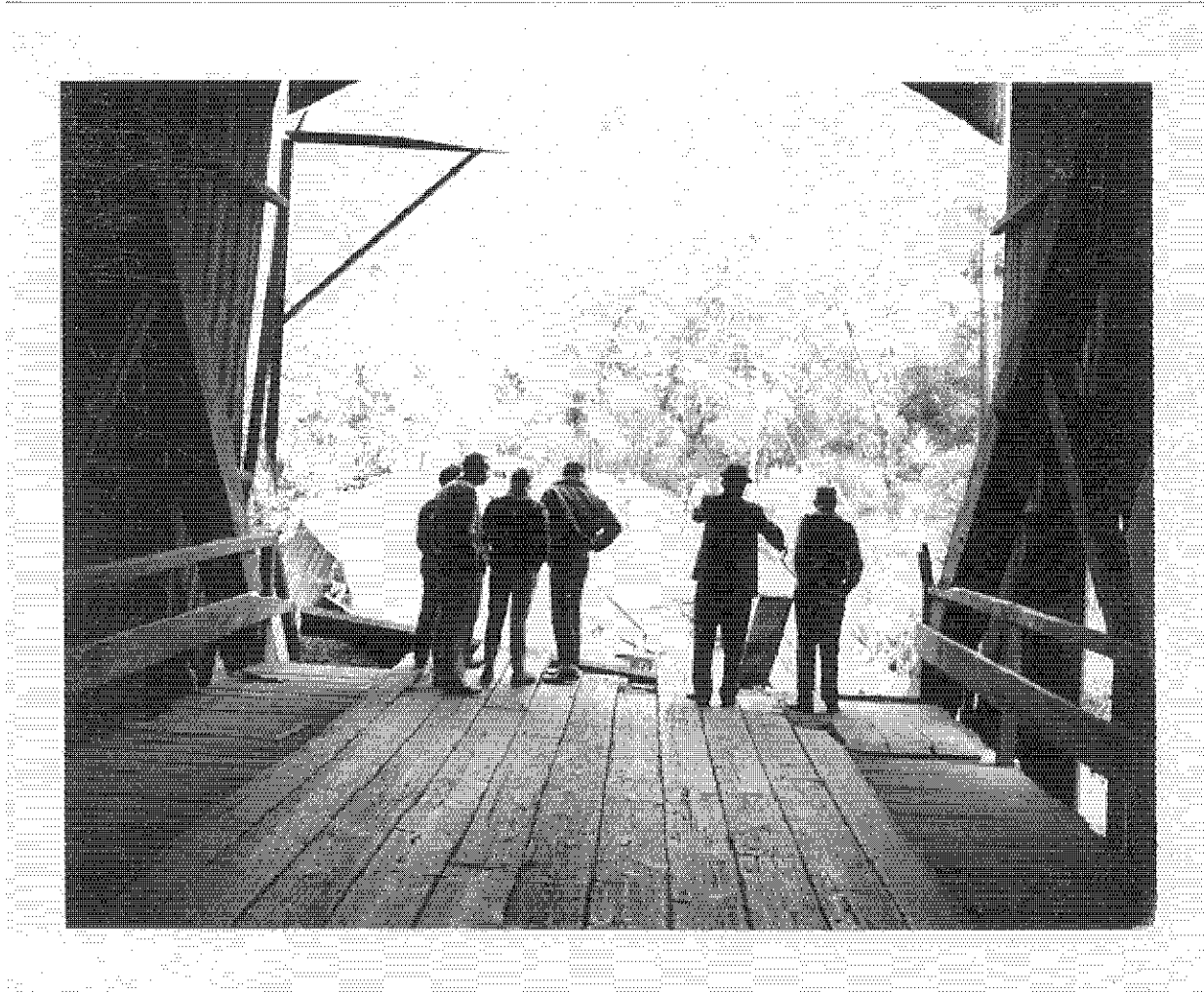
**HONEY RUN BRIDGE
(Carr Hill Bridge)
HAER No. CA-312
(Page 10)**

April 12, 1965. Photograph courtesy of Raymond Cooper.



**HONEY RUN BRIDGE
(Carr Hill Bridge)
HAER No. CA-312
(Page 11)**

April 12, 1965. Photograph courtesy of Raymond Cooper.



**HONEY RUN BRIDGE
(Carr Hill Bridge)
HAER No. CA-312
(Page 12)**

April 12, 1965. Photograph courtesy of Raymond Cooper.



Sources

Adams, Kramer A. Covered Bridges of the West: A History and Illustrated Guide. Berkley, CA: Howell-North, 1963.

American Society of Civil Engineers, Committee on History and Heritage. A Biographical Dictionary of American Civil Engineers, vol., 1. ASCE Historical Publication No. 2 (1972).

American Society of Civil Engineers, Committee on History and Heritage. American Wooden Bridges. ASCE Historical Publication No. 4. New York: American Society of Civil Engineers (1976).

Baker, Jeanne. An Undercover Story: Covered Bridges of California. Chapel Hill, NC: Chapel Hill Press, 2000.

Becker, Donald. "Honey Run Covered Bridge," undated, typed manuscript in the files of the Butte County Department of Public Works, Oroville, California.

Brock, F.B. "Truss Bridges, An Illustrated Historical Description of All Expired Patents on Truss Bridges," Engineering News and American Contract Journal, October 23, 1882-September 8, 1883.

Butte County Board of Supervisors Minutes, 1883-1965.

Butte County, California, Illustrations. Oakland: Smith & Elliott, 1877.

Butte County Department of Public Works, Bridge Records.

Chico Enterprise, 1886.

Condit, Carl W. American Building. Chicago: University of Chicago Press, 1968.

Condit, Carl W. American Building Art: the Nineteenth Century. New York: Oxford University Press, 1960.

Conwill, Joseph D. "Research Notes and Annotated Bibliography for HAER Covered Bridge Project 2002," typed notes.

Honey Run Covered Bridge Association. Honey Run Covered Bridge: An Historical Site Preserved. Paradise, California: Dick Ehram Printing, n.d.

- Darnell, Victor. A Directory of American Bridge Building Companies. Washington, DC: ASCE Occasional Publication, 1984.
- Hallen, Kent, Dan Ostrander and Charleen Kerley. Chico Centennial Magazine: A Journey Through Time 1872-1972. Chico: Centennial Magazine Committee, 1972.
- Hintz, Hamilton L. "Covered Spans Nearly 100 Years Old Serve Farmers," The Sacramento Bee, December 10, 1955, p.F-2.
- Honey Run Covered Bridge Association. "Honey Run Covered Bridge and the Butte Creek Canyon Area, Butte County, California." ca.1965.
- "Honey Run Covered Bridge," Butte County Historical Society Diggins, vol. II, no. 2, Summer 1967.
- "Honey Run Covered Bridge Steeped in History," Butte County Senior Post, vol. 2, no. 8, April 1993.
- Hutchinson, W.H. History of Butte County, California. 1882.
- James, J.G. "The Evolution of Wooden Bridge Trusses to 1850," Institute of Wood Science Journal vol. 9, nos. 3 and 4, June and December 1982, issues 51 and 52.
- Krekeler, Brenda. Covered Bridges Today. Canton, OH: Daring Books, 1989.
- Mansfield, George C. History of Butte County, California. Los Angeles: Historic Record Company, 1918.
- McCoy, B.L. "Official Map of the County of Butte, California, 1901."
- McDonald, Lois. "The Roads and Bridges of Butte Creek Canyon," Butte County Historical Society Diggins, vol. 38, no. 1 and 2 (Spring-Summer 1994), p.30-38.
- McGie, Joseph F. History of Butte County, 1840-1919.
- McKee, Brian J. Historic American Covered Bridges. New York: ASCE Press, American Society of Civil Engineers, 1997.
- McGann, James. "Official Map of the County of Butte, California, 1886"
- Mikesell, Stephen D. Historic Highway Bridges of California. Sacramento: California Department of Transportation, 1990.

Morley, S. Griswold. The Covered Bridges of California. Berkeley, CA: Univeristy of California Press, 1938.

National Register of Historic Places Registration Form: Honey Run Covered Bridge, 1988.

Nelson, Joseph C. Spanning Time: Vermont's Covered Bridges. Shelburne, Vermont: The New England Press, 1997.

Plowden, David. Bridges: the Spans of North America. New York and London: W.W. Norton Co., 1974.

Pomeroy, George G. "California's Covered Bridges," Covered Bridge Topics, vol. 20, No. 3, October 1962, pp. 1, 5-7, 9.

"Pratt, Thomas Willis," biographical sketch in Dictionary of American Biography, vol. 8. New York: Charles Scribners Sons, 1944, p.179.

Sloane, Eric. American Barns and Covered Bridges. New York: Wilfred Funk, Inc., 1954.

"Tailings of Butte Creek Canyon 1833-1971." Centerville Recreation and Historical Association Inc., 1972, p. 77.

Talbitzer, Bill. Butte County: An Illustrated History. Northridge, California: Windsor Publications, 1987.

Van de Kamp, Mark. "Renewed Effort Needed to Keep Honey Run Covered Bridge Afloat," Paradise Post, October 20, 1987, p.A7.

Warren, Donald R. Co. Engineers. "A Report on the County Highway Bridges of Butte County, California. San Francisco, 1947.

Waterland, John S. "Behind the Building of Honey Run Road," Chico Enterprise-Record, January 3, 1988, p.68.

Wells, Harry L. History of Butte County, California. San Francisco: Francis Valentine & Co., 1882.

Wetherbee, Ira A. Butte County California Illustrations. Oakland: Smith & Elliot, 1877.